



VIRGINIA'S TRIBUTARY STRATEGIES

A customized approach to reduce nutrient pollution
in the rivers flowing into the Chesapeake Bay

Revising Virginia's Chesapeake Bay Tributary Strategies

The James River

Introduction

Since the early 1990s, Virginia has worked to develop and implement water quality plans, tributary nutrient reduction strategies, for each main tributary river of the Chesapeake Bay. These strategies have their beginnings in the Chesapeake Bay Program and the scientific research that identified excess nutrients, primarily nitrogen and phosphorus, and sediment as the greatest water quality problems faced by Chesapeake Bay and its tributaries.

Virginia's tributary strategies are based on a cooperative, voluntary approach to restoring water quality. In developing these strategies, Virginia's natural resources agencies work closely with local governments, farmers, conservation groups, wastewater treatment plant operators and others who have an important stake in ensuring clean water in their community. This locally based approach helped the commonwealth and its citizens craft tributary strategies with effective solutions rooted in practical methods.

James River Watershed Fast Facts

- *Drainage Area in Acres:* 6,551,345
- *Square Miles:* 10,236.4
- *About 24 percent of Virginia's land*
- *Length:* 350 miles
- *Counties:* 57
- *Cities:* Buchanan, Buena Vista, Clifton Forge, Charlottesville, Chesapeake, Colonial Heights, Covington, Hampton, Hopewell, Lexington, Lynchburg, Newport News, Norfolk, Petersburg, Portsmouth, Richmond, Suffolk, Virginia Beach, Williamsburg
- *2000 Population:* 2,604,246 (Upper James = 91,607; Middle James = 1,221,792; Lower James = 1,290,847)
- *Headwaters:* Jackson and Cowpasture Rivers
- *Larger Tributaries:* Appomattox River, Chickahominy River, Hardware River, Jackson River, Maury River, Rivanna River

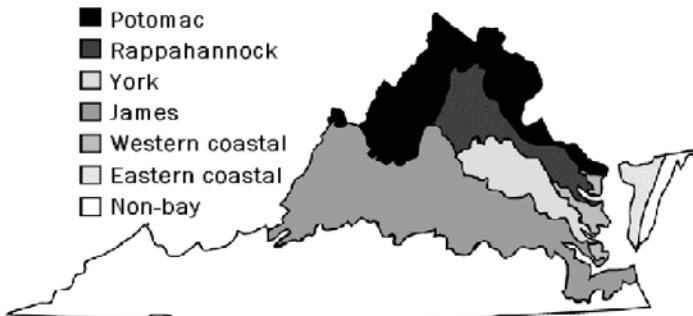
Today Virginia and her bay state partners face a new and daunting chapter in restoring water quality that will sustain living resources and aquatic habitats in the bay and its tidal tributaries. Changing water quality conditions have led Chesapeake Bay partners to develop new nutrient and sediment reduction goals. An ambitious timetable adopted in the new Chesapeake Bay Agreement, *Chesapeake 2000*, calls for removing the bay and its tidal tributaries from the federal list of impaired waters by 2010. With the new goals in hand, Virginia is now embarking on a process with local stakeholders to revise existing tributary strategies. Natural resource agency staff will work with stakeholders in each basin seeking common agreement on what needs to be done and how best to do it.

Focus on Nutrients and Sediment

Nutrient enrichment is a surplus of phosphorus and nitrogen that runs off land, settles from the air, or is discharged from industrial or municipal sources. It's one of the bay system's key pollution problems.

Virginia's Bay Watersheds

- Potomac
- Rappahannock
- York
- James
- Western coastal
- Eastern coastal
- Non-bay



Another is sediment, coming mainly from erosion that can smother aquatic plants and animals.

The rivers and the bay support various valuable living resources such as oysters, fish, crabs, waterfowl and many kinds of underwater plants. This aquatic life needs dissolved oxygen to survive. But excess nitrogen and phosphorus over-fertilize bay waters causing an abundance of algae that prevent sunlight from reaching underwater plants. When the algae die, the decay process robs the water of oxygen.

Nutrients occur naturally and would flow into bay waters even if people were not living in its watershed. But excess amounts of nutrients come from sewage treatment plants, some industries, agricultural and lawn fertilizers, and a variety of other sources.

There are two main pathways nitrogen and phosphorus take to enter the bay and its rivers. One is *point source pollution*, which occurs primarily when sewage treatment plants and industrial facilities discharge treated wastewater into a river or stream. The other is *nonpoint source pollution*, most of which is runoff from farm and pasture land, and from development in urban and suburban areas.

For point sources, Biological Nutrient Removal (BNR) technology is one key to success. BNR can eliminate between 60 and 85 percent of the nutrients that treatment plants discharge.

For nonpoint source pollution, best management practices (BMPs) are the key to reducing nutrient levels. Farmers, in particular, can and do reduce nonpoint source pollution by conscientiously managing agricultural land. The core of the nonpoint portion of any tributary strategy is the continuation of current programs and activities, such as farm plan implementation, conservation tillage, nutrient management, and management of animal wastes and highly erodible lands, plus greater focus on lawn care by homeowners. Stormwater management also is

Natural resource agency staff will work with stakeholders in each basin seeking common agreement on what needs to be done and the best ways to do it.

key to eventual success in nutrient and sediment reductions.

The James River Watershed

The James River watershed is Virginia's largest. It covers about 10,236 square miles, nearly a quarter of the entire state. The 2000 James River watershed population was 2,604,246 people, most living in eastern regions.

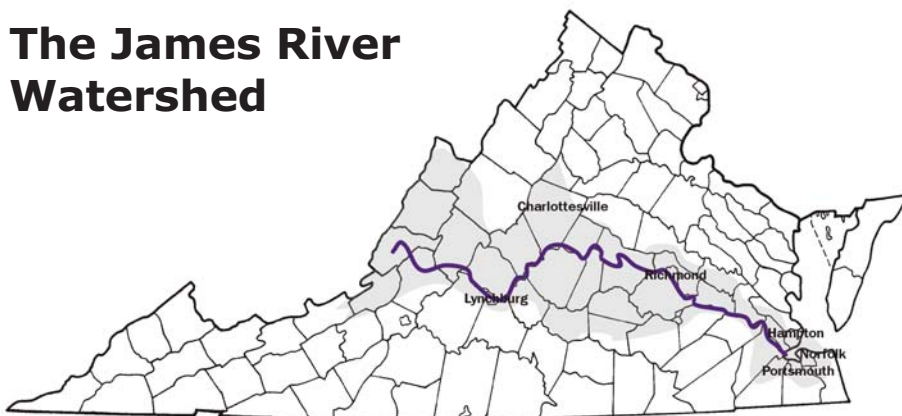
Major Pollutants

Like the other sub-watersheds of the Chesapeake Bay, the major pollutants the James Tributary Strategy continues to focus on are nitrogen, phosphorus and sediment. Many local governments cite overuse of fertilizers, failing septic systems and impacts of urban development as major sources for these pollutants.

Methods of Controlling Pollution

There are many effective ways to curtail pollution in the James watershed. Education on proper lawn care and maintenance of septic systems, municipal wastewater treatment upgrades, greater installation of agricultural and forestry BMPs, better stormwater management, and erosion and sediment control are but a few. Individual citizens can become involved in hands-on programs such as the Department of Conservation and Recreation's Adopt-A-Stream and water monitoring activities that encourage environmental awareness and stewardship.

The James River Watershed



Watershed Management Planning

Watershed management planning is a detailed vision and strategy to manage watersheds, usually at the local level. The plan identifies actions to restore habitat and water quality, details lands for conservation and appropriate development, specifies locations of and ways to reduce point and nonpoint sources of pollution, and prioritizes pollution reduction actions. Watershed management planning is underway

throughout the James watershed. For example, James City County and the James River Association and Center for Watershed Protection have written a plan for Yarmouth Creek and are currently working on a second watershed management plan for the Powhatan Creek watershed. Henrico and Chesterfield counties use geographic information systems (GIS) to manage county resources on a watershed level. Prince Edward County is developing a watershed management plan for the Sandy River reservoir, and a Friends of Rockfish Watershed (Nelson and Albemarle counties) group is implementing its watershed plan.

Previous Tributary Strategy Work

The initial *James River Basin Tributary Nutrient and Sediment Reduction Strategy* was completed in July 1998. It provided information on water quality and living resources habitat conditions in the James River, stated actions taken to date for reducing pollutants, and provided an overview of additional management actions that could further restore the health and productivity of the river. Because restoration goals (nutrient load allocations) were not available when it was published, the initial strategy document was not specific enough for implementation.

The Chesapeake Bay Program's computer-based Water Quality Model enabled identification of allocation loads – “caps” – for nitrogen, phosphorus and sediment. With such information in-hand, a forum for stakeholders was created for widespread input into a goal setting process. The forum, the James River Technical Review Committee (TRC), was composed of representatives from public wastewater treatment facilities, community watershed organizations, soil and water conservation districts, industry and local governments. Staff from the Chesapeake Bay Program office of the U.S. Environmental Protection Agency and various state agencies provided technical assistance to the committee.

After several attempts, the TRC was unable to reach consensus on appropriate nutrient and sediment goals for the James River. As a result, the nutrient and sediment reduction goals were established using the output from the Chesapeake Bay Water Quality Model. The goals were described as follows:

- 9 percent sediment reduction from 1985 levels for the entire basin by 2010 (a reduction of 113,940 tons from 1.266 million tons)
- For areas draining directly to tidal fresh portion of the James, BNR implementation at point sources and an equivalent reduction in nonpoint sources by 2010 would result in 32 percent nitrogen and 39 percent phosphorus load reductions compared with 1985 levels.

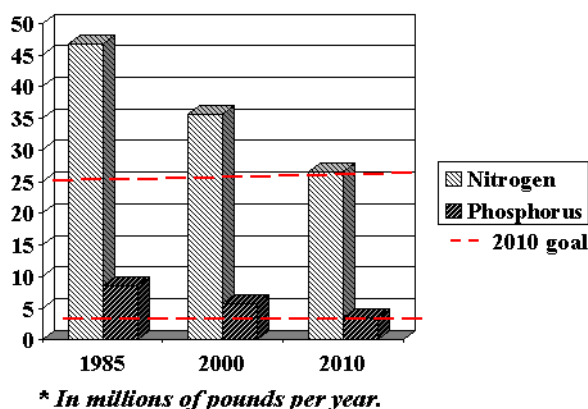
New Load Allocations set in 2003 for the James River Watershed

New nutrient and sediment load allocations were determined by the multi-jurisdictional Chesapeake Bay Program for all sub-watersheds of the larger Chesapeake Bay watershed in 2003. Changes for the James River include a 26 percent reduction in nitrogen, a 40 percent reduction in phosphorus and 23 percent reduction in sediment loads from levels observed in 2000.

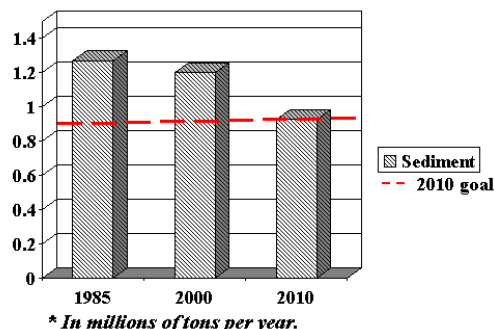
James River Watershed: C2K total nitrogen, phosphorus and sediment load allocations (includes point and nonpoint source pollution).

Year	Tot. N (million lbs/yr)	Tot. P (million lbs/yr)	Sediment (million tons/yr)
1985	46.7	8.47	1.27
2000	35.5	5.69	1.20
CAP	26.4	3.41	0.93
% CHG 85-00	-24%	-33%	-5%
% CHG 00-CAP	-26%	-40%	-23%

James River Basin N&P Change with 2010 Goal*



James River Basin Sediment Change with 2010 Goal*



The above charts show the change in total nitrogen, phosphorus and sediment in the James watershed between the original baseline year, 1985, and the newly established baseline year of 2000. Accomplishments within that 15-year period are displayed in the table as a percent change for each pollutant. The cap loads, which

were set by the Chesapeake Bay Program, have been determined for each pollutant and are also listed above. The newly revised tributary strategy will devise a plan on how to meet and maintain the updated, reduced loads.

What Lies Ahead

Between now and April 2004, the state will redouble its efforts to revise the James River Tributary Strategy. The state will work with diverse stakeholders representing local governments, agricultural and development communities, soil and water conservation districts, wastewater treatment operators, planning district commissions, conservation groups and others to develop a strategy unique to the James River watershed. The strategy is meant to meet the assigned nutrient and sediment reduction goals.

This new strategy will provide a menu of reduction actions that focus on varied pollution sources and land uses. As in past strategies agricultural practices and wastewater treatment plant improvements will be important. It is also anticipated that the strategy will focus more on urban and suburban stormwater management, changing land use, low impact

development and public education than did previous work.

The strategy will examine reductions that can be achieved locally with existing resources. It will explore what might be achieved locally with additional resources and what could be accomplished through broader statewide initiatives.

The strategy will outline a phased approach to implementation and to capping nutrient and sediment loads once the reduction goals are reached. It will also look at the future need to track nutrient and sediment loads and allocations as this reduction strategy becomes a cap strategy.

You are encouraged to become involved in this important process. For more information on the development of the new James River Tributary Strategy or on other water quality initiatives in the James River watershed, contact: Upper James, Tamara Keeler, (540) 332-8955, tkeeler@dcr.state.va.us; Piedmont James, Michael Bowman, (804) 527-4484, mbowman@dcr.state.va.us; Lower James, Ernie Brown, (757) 925-2468, ebrown@dcr.state.va.us.

